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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/835,620 | Applicant(s) TAKASHIMIZU, YOSHIHIRO |
|---|---|---|
| | Examiner Lucas Divine | Art Unit 2624 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☒ Claim(s) *4,5,10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 April 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

1. The abstract of the disclosure is objected to because it contains 173 words. Correction is required. See MPEP § 608.01(b).

2. The abstract of the disclosure is objected to because in line 15 the second corrector unit 'defects.' This word should be 'detects' based on the nature of the specification. Correction is required. See MPEP § 608.01(b).

### *Drawings*

3. The drawings are objected to because the line output from the 'third corrector unit' 104 in Fig. 17B does not have a corresponding line in Fig. 17A.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Claims 7, 13, 14, 17, 18, and 19 include a controller unit to input the data that is input to the first unit to the second and/or third unit. Figs. 17A&B, 57A&B, and 59A&B do not show the controller unit 75 affecting or controlling through control lines or functional blocks how the data is input to the corrector units 88, 94, and 100.

The figures appear to show the data leaving the matrix cut-out unit 78 and being inputted to the corrector units simultaneously in parallel without control and timing of the inputs. Therefore, the limitation "**data input to first corrector unit is input to said second and third image-quality corrector units**" is not shown and must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

5. Claims 1 – 25 are objected to because of the following informalities: they include the limitation "**images represented by input binary black**" in the preambles of the independent

claims. 'Black' is not a binary data form that can represent images. Appropriate correction is required.

6. Claim 20 is objected to because of the following informalities: on page 111, lines 7-9 the phrase "**to thereby smooth the detected patterns.**" is repeated twice. Appropriate correction is required.

7. Claim 24 is objected to because of the following informalities: page 112, line 12 states "**perform remove a removal-candidate pixel**." This phrase would be better written as: "perform *removal of* a removal-candidate pixel." Appropriate correction is required.

8. Claims 3 – 6 are objected to because of the following informalities: independent claim 3 includes the phrase "**to error-variance method**". This phrase would be better written as: "to *an* error-variance method". Appropriate correction is required.

9. Claims 15 – 16 are objected to because of the following informalities: the method claims do not include appropriate step language. A listing of specific steps is required in method claims. Examples include 'a detection step' or 'a distribution step'. Appropriate correction is required.

10. Claims 3 – 6, 9, 12, 14, 16, 18, and 19 are objected to because of the following informalities: the pixel size is not reduced or distributed (as shown in Figs. 42A, 42B, and 42C). The pixel intensity is reduced and distributed. These claims all refer to pixel size reduction. A suggested correction would be changing "**pixel size**" to "**pixel intensity**". Appropriate correction is required

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 10, claim 10 states that the first corrector unit (first discussed in parent claim 7) detects isolated pixels. Parent claim 7 states that the first corrector unit **detects irregular patterns other than an error-variance method**. In the disclosure, the applicant states that the detecting **isolated pixels is done according to an error-variance method** (see spec page 12 lines 14-19, also in claim 3 and further throughout disclosure). Therefore there is an inconsistency between whether or not the detection of isolated pixels is according to an error variance method, claim 10 claims to have a first corrector unit not according to an error-variance method but detects isolated pixels while it is clearly taught throughout (specific example page 12 lines 15-18, wherein the isolated pixels are generated according to an error-variance method) that the detecting isolated pixels is done according to an error-variance method. Thus, there is no written description disclosing the isolated pixel detection that **other than an error-variance method** that claim 10 is claiming. Appropriate correction of this inconsistency is required.

Regarding claim 11, which depends from claim 10 as it depends from claim 7, claim 11 is rejected due to the inherited rejected limitations from claim 10 as discussed above.

12. Claims 1, 2, 7 – 13, 15, 17, and 20 – 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, on page 99 lines 11 and 12, claim 1 recites 'substantially vertical vertical-line patterns' and 'substantially horizontal horizontal-line patterns'. These limitations are vague and indefinite because one of ordinary skill would not know what substantially vertical or horizontal would be and the specification fails to clearly point out the distinction between being substantially vertical or horizontal and not. While Figs. 31, 32, and 33 show examples of vertical and horizontal line patterns, they are not definite as to what types of patterns are included in the phrase 'substantially vertical or horizontal'.

Regarding claims 7, 15, 17, and 20, these claims all include the same limitation as claim 1 and are rejected for the same reasons as stated above in the rejection of claim 1.

Regarding claims 2, 8 – 13, and 21 – 25, these claims are all dependent from independent claims with the indefinite limitation, thus inheriting the limitation. Therefore, these claims are rejected for the same reasons as stated above.

13. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 13, claim 13 recites the limitation "**said third image-quality corrector unit**" in page 104 lines 9 and 17. There is insufficient antecedent basis for this limitation in the claim.

14. Claims 7 – 13, 17, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 7, in page 101 line 21 the applicant claims '**wherein said image-quality corrector unit**.' Applicant has previously defined two image-quality corrector units. Clarification as to which '**said image-quality corrector unit**' (first or second) is being referenced is required to make the claim definite.

Regarding claims 8 – 13, these claims are rejected because of their dependence on rejected claim 7 above, thus inheriting the indefinite limitation.

Regarding claim 12, on page 103 line 26, claim 12 recites the limitation '**said image quality corrector unit**.' In parent claim 7, a 'first' and a 'second' image-quality corrector unit are claimed. Thus, claim 12 is indefinite for failing to particularly point out which image quality corrector is being referred to (i.e. the first or second). Appropriate correction is required.

Regarding claim 17, in page 107 line 4, the applicant claims '**said image-quality correction step**.' Applicant has previously defined two image-quality correction steps, thus making this phrase indefinite. Clarification as to which '**said image-quality correction**' (first or second) is being referenced is required to make the claim definite.

Regarding claim 18, in page 108 line 11, the applicant claims '**said image-quality correction step**.' Applicant has previously defined two image-quality correction steps, thus making this phrase indefinite. Clarification as to which '**said image-quality correction step**' (first or second) is being referenced is required to make the claim definite.

15. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 21, in page 111 lines 10-11, the applicant claims the scale-varying processor unit "**magnifies the size of the original image to a predetermined image size**" and then further claims that the unit then "**reduces the magnified size to the predetermined size.**" If the image has been magnified to a predetermined size, the unit cannot reduce the image to '**the**' predetermined size because it has already been magnified to that same predetermined size. The claim language is vague and indefinite because the examiner does understand if there is another predetermined size for reductions or if the predetermined size is standard for both magnification and reduction. Appropriate action is required to make the claim definite.

16. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 12, claim 12 recites the limitation "**corrector unit uniformly distributes reduced pixels obtained through reduction in the size of the detected isolated**

**pixel to peripheral pixels**" in pages 103 lines 26-27 and 104 lines 1-2. There is insufficient antecedent basis for this limitation in the claim because there is no recitation of a corrector unit detecting isolated pixels in the parent claim 7.

17. Claims 7 – 14 and 17 – 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 7, on page 101 lines 13-15 the applicant claims detecting patterns "**that are specific to binary processing (binary coding) according to a method other than an error-variance method**". This phrase is vague and indefinite because one of ordinary skill cannot know what is being claimed for the following reasons:

a) The claim describes detecting patterns according to a method which is **not** an error-variance method without describing what method the binary processing **is** according to.

b) Also, 'patterns specific to binary processing' is not definite or particularly pointing out a type of processing or detecting since computer data is binary coded data. Thus, being specific to binary coding is too vague to limit the claim.

c) The word 'that' in line 13 of page 101 is vague and indefinite because it does not particularly point out what 'that' is directed to.

Examiner cannot determine what type of detection the first image-quality corrector unit is completing.

Regarding claims 14, 17, 18, and 19, these claims include the first corrector unit with the limitation as listed above. Therefore, they are rejected for the reasons stated above in the rejection of claim 7.

Regarding claims 8 – 13, which depend from claim 7, claims 8 – 13 are rejected based on their dependence on rejected claim 7, thus inheriting rejected limitations.

18. Claims 7 – 14 and 17 – 19 are rejected under 35 U.S.C. 112, **first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 7, on page 102 lines 7-11, the applicant claims to "**said first image-quality corrector unit is used to process the input black and white pixel data by interrupt processing being performed by the second image-quality corrector unit**". The specification does not disclose an interruption of the second image-quality corrector unit. As shown in Figs. 18A&B and described on pages 59-63 of the specification the applicant teaches that if the first patterns match S4, an interruption flag is set S12 (page 59 line 25). This interruption flag further prevents the second and third corrector units from performing detections and processing in decision step S5.

By setting a flag and preventing the second and third units from performing detections and processing, the system is not interrupting the processing of the second image-quality corrector unit. The second corrector unit does not begin processing so no interruption is made.

Also, setting a decision flag sets up the system for a future determination, it does not immediately cause an interruption.

The disclosure therefore does not enable one of ordinary skill in the art to make and use the controller unit performing said interrupting and claim 7 is rejected for this lack of enablement.

Regarding claims 13, 14, 17, 18, and 19, these claims include the controller unit with the interrupting limitation as listed above. Therefore, they are rejected for the reasons stated above in the rejection of claim 7.

Regarding claims 8 – 13, which depend from claim 7, claims 8 – 13 are rejected based on their dependence on rejected claim 7, thus inheriting rejected limitations.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

19. Claims 1 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Arai et al. (US 6574367) hereafter referred to as Arai.

Regarding claim 1, Arai teaches an image data processing system that performs the same functions as the **printer** claimed in claim 1, including comprising:

**an image-quality corrector unit** (all functions of Fig. 1 are included in the disclosed apparatus, which is functioning as an image-quality corrector unit) **for detecting second irregular patterns that are represented by data included in the input black and white pixel data and that are specific to an error-variance method** (match-checking unit 5 matches extracted patterns with templates for horizontal, vertical, and slanting line patterns as completed in step S2, Fig. 2; col. 3 lines 42-47 and col. 2 lines 38-42; the black and white pixel data of Arai can be inputted as multi-level image data [col. 2 line 22], referring to halftone gradation levels of the input data),

**wherein said image-quality corrector unit detects at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns to thereby smooth the detected second irregular patterns** (col. 2 lines 33-37 and col. 4 lines 1-32 teach the detection of irregular patterns in horizontal lines and vertical lines, which read on 'at least one type').

*Note: on page 6 of applicant's specification, lines 12-16, applicant explains an error-variance method as a halftone gradation processing to produce the black and white pixel data. Error-variance limitation has thus been read in the claims in light of said definition in the specification.*

Regarding claim 15, the structural elements of claim 1 perform all of the steps of method claim 15. Therefore, method claim 15 is rejected for the reasons stated in the rejection of claim 1 above.

20. Claims 3, 6, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Seto et al. (US 5381522) hereafter referred to as Seto.

Regarding claim 3, Seto teaches **a printer for performing correction to improve the quality of images represented by input binary black and for printing the images** (printer 53 with controller 52 which provides for image correction)**, comprising an image-quality corrector unit** (53)

**for detecting isolated pixels that are specific to error-variance method** (Figs. 17A&B show smoothing result providing halftone gradation processing of the black and white character data [graded character data shown in Fig. 24] as inherent to the invention of Seto) **and that are represented by data included in the input black and white pixel data** (Fig. 12A shows the detected isolated pixel discussed in col. 9 line 17) **and**

**for distributing the detected isolated pixel to peripheral pixels to thereby reduce the pixel size** (Fig. 12C shows the diffusion 'distribution' equations for diffusing the isolated pixel to peripheral pixels; discussed in col. 9 lines 11, 17-19, and 25-29).

Regarding claim 6, which depends from claim 3, Seto further teaches that the **image-quality corrector unit uniformly distributes reduced pixels obtained through reduction in the size of the detected isolated pixel to peripheral pixels in a plurality of directions** (Fig. 12C teaches the diffusion in all directions with the inclusion of all peripheral pixels in the diffusion equation, examples of diffusing 'distributing' in a plurality of directions can be seen in Figs. 14A, 15A, 16A, 19A, 20A and 21A).

Regarding claim 16, the structural elements of claim 3 perform all of the steps of method claim 16. Therefore, method claim 16 is rejected for the reasons stated in the rejection of claim 3 above.

21. Claims 20, 21, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (US 5535007) hereafter referred to as Kim.

Regarding claim 20, Kim teaches an image processing system that can be imbedded in a 'scanner, facsimile, a digital copier or the like', which includes **printers** (col. 1 lines 9-10). This **printer** is used **for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:**

**a scale-varying processor unit for varying the size of an original image optically scanned** (CPU 100 performs the processing functions of scale varying as shown in the magnification adjusting process 11) **to a predetermined image size** (predetermined size set by input parameters, col. 2 line 27) **by performing pixel-removal processing** (col. 2 lines 36-37, wherein pixel removal processing is completed for image reduction);

**a binary unit for converting the size-varied image into black and white pixel data according to an error-variance method** (A/D converter 3 converts image into binary pixel data, wherein black and white pixels are included in the RGB binary conversion of Kim and Figs. 3&4 show error-variance of the black and white pixel data); **and**

**an image-quality corrector unit for detecting irregular patterns that are represented by data included in the black and white pixel data and that are specific to an error-variance method** (Fig. 1 ref. no. 12, col. 12 lines 61-67, profile emphasizing portion detects

edge irregularities in order to correct and emphasize the edge), **wherein said image-quality corrector unit detects at least one type of substantially vertical vertical-line irregular patterns caused through the pixel-removal processing, substantially vertical vertical-edge irregular patterns, substantially horizontal horizontal-line irregular patterns, substantially horizontal horizontal-edge irregular patterns; and thin-line patchy patterns to thereby smooth the detected patterns** (col. 12 lines 61-67 teach the detection of irregular patterns in edges, which reads on 'at least one type').

Regarding claim 21, which depends from claim 20, Kim further teaches that the **scale-varying processor unit magnifies the size of the original image to a predetermined image size** (col. 2 line 27 teaches that input parameters predetermine the size of magnification and reduction; col. 11 line 11 teaches the magnification/reduction based on a predetermined number N) **according to pixel-interpolation** (col. 11 lines 46-54 teach magnification according to pixel-interpolation), **and then reduces the magnified image size to the predetermined image size by performing the pixel-removal processing** (col. 2 line 35 teaches reduction by performing pixel removing).

Regarding claim 25, which depends from claim 20, the system of Kim further **performs comparison of the input data to the irregular patterns registered** (detection of irregular edges in col. 12 lines 61-64); **and when pattern-matching is detected, said image-quality corrector unit performs area gradation correction for converting an area at a predetermined position in an n-divisional pixel (n=natural number) of the attention pixel and a predetermined number of intrapixel divisional areas to black areas** (col. 12 lines 61-64, wherein the edge emphasizing portion 12 takes the irregular edges and emphasizes them,

performing area gradation correction on irregular lines to correct irregularities in the line after the image has been magnified in the previous step; see Fig. 1).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

22. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ishida et al. (US 5832141) hereafter referred to as Ishida.

Regarding claim 24, which depends from claim 20, Kim teaches all of the limitations of parent claim 20.

While Kim teaches an image adjusting system for scale-varying, smoothing, and edge detection; Kim does not specifically teach that the **scale-varying processor unit does not perform remove a removal-candidate pixel either when the level of the removal-candidate pixel is bright, and the overall tone of peripheral pixels thereof is dark; or when the level of the removal-candidate pixel is dark, and the overall tone of peripheral pixels thereof is bright.**

Ishida teaches an image adjusting system that does **not perform** smoothing '**removal of a removal-candidate pixel' either when the level of the removal-candidate pixel is bright, and the overall tone of peripheral pixels thereof is dark; or when the level of the removal-candidate pixel is dark, and the overall tone of peripheral pixels thereof is bright** (col. 18

lines 60-65, wherein detected pixels where the contrast between the candidate and peripherals is high – as in isolated points, fine curves, and the like – the system makes the decision to not perform smoothing 'pixel removal').

It would have been obvious to one of ordinary skill in the art to check the contrast of the candidate against the peripheral pixels and make a removal decision based on that in the system of Kim. Kim specifically teaches in col. 12 lines 61-64 a motivation of emphasizing lines (not smoothing) when there is an edge. The same reason applies to the overall idea of any pixel candidate that is in contrast with peripheral pixels around it. Removing the pixel would remove detail from the image and would therefore not be desirable.

23. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ishida and Lee (US 6226050) hereafter referred to as Lee.

Regarding claim 23, which depends from claim 20, Kim teaches all of the limitations of parent claim 20.

While Kim teaches an image adjusting system for scale-varying, smoothing, and edge detection; Kim does not specifically teach making a decision to removal the pixel or not based on contrast features of the pixel area.

Ishida teaches an image adjusting system that does not perform smoothing '**removal of a removal-candidate pixel**' the contrast between the candidate and peripherals is high – as in isolated points, fine curves, and the like (col. 18 lines 60-65). Ishida further teaches the use of using calculations of peripheral elements in col. 19 lines 22-38, wherein the determining of whether or not to perform smoothing 'pixel removal' is decided by **calculating** number of

vectors peripheral to the pixel and comparing that to a **predetermined size**, in the example, 32 to make the smoothing decision.

It would have obvious to one of ordinary skill in the art to add smoothing decision making as in Ishida in the system of Kim as discussed above in the rejection of claim 24.

The combination of Kim and Ishida does not specifically teach **calculating absolute values as a gradient variation amount and basing the removal based on said calculation.**

Lee teaches **calculating absolute values as a gradient variation amount and basing the removal based on said calculation.** In col. 1 lines 40-67 list the calculation of calculating a gradient (line 44) and absolute values (line 48) and making the filtering (acting as pixel removal) based on the comparison of the calculation to a threshold value (steps c-e are the detection of an edge by means of comparing the calculations to threshold values and making a filtering decision based on that). Col. 3 lines 47-50 have more discussion of the comparison.

It would have been obvious to one of ordinary skill in the art to perform the gradient variation calculation of Lee instead of the contour value calculation of Ishida in the determining whether or not to smooth/filter/pixel remove. The motivation for doing so would have been to provide the system of Kim and Ishida a more accurate determination of when to remove the pixel and when not to because of the more accurate absolute value gradient variation calculation. The absolute value calculations judge each peripheral pixel while the contour vector calculations take averages of sets of peripheral pixels.

Regarding claim 22, which depends from claim 20, arguments analogous to that of the rejection of claim 23 are applicable to claim 22 and claim 22 is rejected for the same reasons.

Further, calculating a gradient variation is also completed in the detection process (col. 1 line 44).

24. Claims 2, 7, 8, 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama (US 6278804) and Arai.

Regarding claim 2, which depends from claim 1, Arai teaches all of the limitations of parent claim 1.

While Arai teaches the **comparison of the input data to the irregular patterns registered and the detection thereof** (see rejection of claim 1), Arai does not specifically teach **performing area gradation correction for converting an area at a predetermined position in an n-divisional pixel (n=natural number) of the attention pixel and a predetermined number of intrapixel divisional areas to black areas.**

Okuyama teaches the detection of irregular patterns (template circuit 203 as shown in Fig. 1 and 5) and the **performing of area gradation correction for converting an area at a predetermined position in an n-divisional pixel (n=natural number)** (n divisional number discussed in col. 7 lines 50-55) **of the attention pixel and a predetermined number of intrapixel divisional areas to black areas** (sections with detected irregular patterns are input to smoothing section 206 which smoothes by performing area gradation correction by converting to black areas as discussed in col. 8 lines 7-11).

It would have been obvious to one of ordinary skill in the art to smooth the detected irregular patterns detected in Arai with the smoothing process of Okuyama. The motivation for

doing so would have been to provide better image quality by correcting irregularities in the irregular lines detected by Arai.

Regarding claim 7, Okuyama teaches an image processing apparatus for the processing of input black and white image data comprising:

**a first image-quality corrector unit for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to binary processing (binary coding) according to a method other than an error-variance method to thereby smooth** (Fig. 1 smoothing section 206, Fig. 12 step S6) **the detected first irregular patterns** (Fig. 5, col. 7 lines 30-39, template circuit 203 includes multiple detection units for detecting irregular patterns, including those specific to binary processing);

**a second image-quality corrector unit for detecting second irregular patterns to thereby smooth** (Fig. 1 smoothing section 206, Fig. 12 step S6) **the detected second irregular patterns** (Fig. 5, col. 7 lines 30-39, template circuit 203 includes multiple detection units for detecting irregular patterns, which includes any irregular patterns that can be matched with a template);

**a controller unit for operating such that the black and white pixel data input to said first image-quality corrector unit is input to said second image-quality corrector unit to be processed thereby when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality corrector unit is used to process the input black and white pixel data by interrupting processing being performed by said second image-quality corrector unit when the black and white pixel data matches**

**one of the first irregularity detection patterns** (this limitation was vague and indefinite as stated above in the drawing objections and 112 claim rejections; Examiner concludes the method of input to the units to be that as shown in Fig. 17A, wherein the matrix cut-out unit 78 sends the image data be processed to the detection units in parallel as shown; Okuyama teaches this in Fig. 5 wherein the matrix-forming section 201 sends the image data to be processed to the detection units of template circuit 203 in parallel).

While Okuyama teaches an image correcting system with templates, Okuyama does not specifically state these templates to detect **at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns.**

Arai teaches detecting **at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns** (col. 2 lines 33-37 and col. 4 lines 1-32 teach the detection of irregular patterns in horizontal lines and vertical lines, which read on 'at least one type').

It would have been obvious to one of ordinary skill in the art to detect the specific patterns of Arai as templates in the template circuit 203 of Okuyama. The suggestion of many templates in Okuyama Fig. 5 leads to the motivation of detecting many types of image irregularities to detect and correct. The patterns of Arai are standard problematic issues in images and thus it would have been desirable to include them as templates.

Regarding claim 8, which depends from claim 7, Okuyama teaches the limitations of claim 8 in the smoothing section 206 as discussed in the rejection of claim 2 above. Therefore, claim 8 is rejected based on the reasons stated in the rejection of claim 2.

Regarding claim 13, which depends from claim 7, claim 13 is indefinite for the reasons stated above. A reading suggests a **third corrector unit for detecting irregular patterns** for added detections as shown in Fig. 17B. This limitation is met by Okuyama in Fig. 5, wherein multiple detection units are shown. In regards to the **routing of image data**, Figs. 17A & 17B show the matrix cut-out unit 78 sends the image data be processed to the detection units in parallel as shown; Okuyama teaches this in Fig. 5 wherein the matrix-forming section 201 sends the image data to be processed to the detection units of template circuit 203 in parallel.

Regarding claim 17, the structural elements of claim 7 perform all of the steps of method claim 17. Therefore, method claim 17 is rejected for the reasons stated in the rejection of claim 7 above.

25. Claims 9, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama and Arai as applied to claim 7 above, and further in view of Seto.

Regarding claim 9, which depends from claim 7, Arai and Okuyama teach all of the limitations of parent claims 7 as discussed above.

While the combination of Arai and Okuyama teaches corrector units for detecting and correcting irregular patterns, the combination does not specifically teach **the detection of isolated pixels that are specific to the error-variance method and that are represented by data included in the input black and white pixel data or the distributing of the detected pixels to peripheral pixels.**

Seto teaches **the detection of isolated pixels that are specific to the error-variance method and that are represented by data included in the input black and white pixel data**

**or the distributing of the detected pixels to peripheral pixels** as discussed above in the rejection of claim 3.

It would have been obvious to one of ordinary skill in the art to include isolated pixel templates in the detection template units of Okuyama and Arai (Okuyama Fig. 5). The motivation for doing so would have been to improve the quality of black and white images by making the isolated pixels blend in better with the image (Seto col. 3 lines 11-12 and col. 9 line 55, wherein Seto teaches the diffusion of isolated pixels to improve image quality).

Regarding claim 12, which depends from claim 7, claim 12 is vague and indefinite as stated above in its 112 rejection in regards to the fact there is no isolated pixel detection in the parent claim that claim 12 refers to. A reading suggests the corrector units in claim 7 as detecting isolated pixels as well. The templates of Okuyama and Arai in view of Seto as discussed in the rejection of claim 9 could also detect isolated pixels. Seto further teaches the distribution of isolate pixels in a plurality of directions as discussed in the rejection of claim 6. Therefore, claim 12 is rejected for the reasons stated in the rejection of claim 6.

Regarding claim 18, the structural elements of claim 9 as it depends from claim 7 perform all of the steps of method claim 18. Therefore, method claim 18 is rejected for the reasons stated in the rejection of claims 7 and 9 above.

26. Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuyama and Seto.

Regarding claim 14, Okuyama teaches an image processing apparatus for the processing of input black and white image data comprising:

**a first image-quality corrector unit for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to binary processing (binary coding) according to a method other than an error-variance method to thereby smooth** (Fig. 1 smoothing section 206, Fig. 12 step S6) **the detected first irregular patterns** (Fig. 5, col. 7 lines 30-39, template circuit 203 includes multiple detection units for detecting irregular patterns, including those specific to binary processing);

**a third image-quality corrector unit for detecting second irregular patterns** (Fig. 5, col. 7 lines 30-39, template circuit 203 includes multiple detection units for detecting irregular patterns, which includes any irregular patterns that can be matched with a template);

**a controller unit for operating such that the black and white pixel data input to said first image-quality corrector unit is input to said third image-quality corrector unit to be processed thereby when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality corrector unit is used to process the input black and white pixel data by interrupting processing being performed by said third image-quality corrector unit when the black and white pixel data matches one of the first irregularity detection patterns** (this limitation was vague and indefinite as stated above in the drawing objections and 112 claim rejections; Examiner concludes the method of input to the units to be that as shown in Fig. 17A, wherein the matrix cut-out unit 78 sends the image data be processed to the detection units in parallel as shown; Okuyama teaches this in Fig. 5 wherein the matrix-forming section 201 sends the image data to be processed to the detection units of template circuit 203 in parallel).

While Okuyama teaches an image correcting system with templates, Okuyama does not specifically state these templates **detecting isolated pixels that are represented by data included in the input black and white pixel data and for distributing the detected isolated pixel to peripheral pixels to thereby reduce the pixel size;**

Arai teaches **detecting isolated pixels that are represented by data included in the input black and white pixel data and for distributing the detected isolated pixel to peripheral pixels to thereby reduce the pixel size** as discussed in the rejection of claim 3.

It would have been obvious to one of ordinary skill in the art to include isolated pixel templates in the detection template units of Okuyama (Okuyama Fig. 5). The motivation for doing so would have been to improve the quality of black and white images by making the isolated pixels blend in better with the image (Seto col. 3 lines 11-12 and col. 9 line 55, wherein Seto teaches the diffusion of isolated pixels to improve image quality).

Regarding claim 19, the structural elements of claim 14 perform all of the steps of method claim 19. Therefore, method claim 19 is rejected for the reasons stated in the rejection of claims 19 above.

### *Allowable Subject Matter*

27. Claims 4, 5, 10, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form **AND** if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The prior art teaches detecting isolated pixel detections using a plurality of matrix patterns having different sizes (Sakano US

5764812) and also teaches the detection and distribution of isolated pixels (Seto as discussed in rejection of claim 3). The prior art does not teach applying matrix patterns **in the order of larger sizes** or **distributing isolated pixels to peripheral pixels according to the sizes of the matrix patterns**.

***Conclusion***

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-6559974 Morisita 12-6-2003 : teaches image processing apparatus for image correction including detecting and correcting horizontal, vertical, and slanting edges.

US-6229578 Acharya et al. 12-8-2001 : teaches edge-detection algorithm including pixel removing based on gradient calculations compared to threshold values.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucas Divine whose telephone number is 703-306-3440. The examiner can normally be reached on Monday - Friday, 7:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lucas Divine
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ljd

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